

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims

Claim 1 (Currently Amended): Apparatus for determining positional information relating to an object, incorporating a transmitter, the apparatus comprising:

a receiver configured to receive signals transmitted by the incorporated transmitter, said receiver comprising a plurality of receiving elements in a single housing or on a common substrate;

a detector for detecting a signal, ~~signals~~ received at each ~~[[the]]~~ receiving element ~~elements and for generating output signals representative of the received signals;~~ and

a processor operable to apply, for each receiving element, a process to the detected ~~output signal generated from the signal received at that receiving element~~ separately from any output signal generated from a signal received at any other receiving element, so as to obtain a respective value of a parameter representative of the time the detected ~~signal~~ signal was received at that receiving element, the processor being further operable to compare the values of the parameter thus obtained so as to obtain angular positional information relating to the object.

Claim 2 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the parameter comprises ~~[[is]]~~ one of phase and time.

Claim 3 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the process ~~to be~~ applied by the processor comprises a process which is dependent upon a characteristic, or an expected characteristic, of the signal ~~signals~~.

Claim 4 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 3, wherein the characteristic, or expected characteristic, comprises ~~[[is]]~~ at least one of frequency, phase, bandwidth, and pulse width.

Claim 5 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the process ~~to be~~ applied by the processor comprises a process which is ~~dependent upon a characteristic, or expected characteristic, of the object, and~~ ~~preferably~~ is dependent upon the distance, or the expected distance, of the object from the receiver.

Claim 6 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, further comprising a selector adapted to select the process ~~to be~~ applied by the processor from a plurality of possible processes.

Claim 7 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 6, wherein:

the apparatus further comprises memory for storing a plurality of sets of process data;
and

the selector is adapted to select one set of process data from the plurality of sets of process data, thereby to select the process ~~to be~~ applied by the processor.

Claim 8 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, further comprising means for changing the process ~~to be~~ applied by the processor in dependence upon one or both of at least one previously obtained value of the parameter and ~~and/or in dependence upon~~ previously obtained positional information relating to the object.

Claim 9 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the process comprises a matched filter.

Claim 10 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 9, wherein the process comprises applying a filter to the detected ~~output~~ signal at a plurality of different time offsets and selecting a time offset in dependence upon the outputs from the filter.

Claim 11 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the operation of the processor comprises application of a matched filter to

detect the interval between signals received by a plurality of the receiving elements,
whereby to determine an angular position of the object.

Claim 12 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 9,
further comprising a matched filter generator for generating the matched filter in
dependence upon the shape of the at least one time varying signal, ~~and preferably in~~
~~dependence upon the shape of the envelope of the at least one time varying signal.~~

Claim 13 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim
12, wherein the matched filter generator is adapted to fit the shape of the at least one
time varying signal, or the envelope of the at least one time varying signal to a function;
~~preferably to a quadratic function.~~

Claim 14 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1,
wherein the receiver and detector are adapted to receive and detect a signal having a
bandwidth greater than 5%, 10% or 20% of its frequency.

Claim 15 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1,
wherein each signal has a characteristic frequency of between 0.5 GHz ~~0.5GHz~~ and 24
GHz, ~~preferably between 2GHz and 12GHz, and more preferably between 5.8GHz and~~
~~7.2GHz.~~

Claim 16 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the signals comprise ~~[[are]]~~ pulsed signals.

Claim 17 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 16, wherein each pulsed signal comprises at least five cycles, ~~and preferably comprises at least 10, 20, 50, 100 or 500 cycles.~~

Claim 18 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 16, wherein each pulsed signal has a pulse length of greater than 2ns, ~~preferably greater than at least one of 5ns, 10ns, 20ns, and 50ns.~~

Claim 19 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 16, wherein the signals comprise a pulse train having a characteristic repetition frequency of between 2MHz and 20 MHz, ~~possibly between 5MHz and 15 MHz, and possibly between 10.5MHz and 13.5MHz.~~

Claim 20 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, wherein the positional information comprises ~~[[is]]~~ an angular position of the object.

Claim 21 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1, further comprising a transmitter for transmitting a probe signal towards the object, and wherein the receiver is adapted to receive a reflection of the probe signal from the object.

Claim 22 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 21, wherein the transmitter is adapted to transmit a different signal to the signal transmitted by the ~~the~~ transmitter associated with the object.

Claim 23 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 21, further comprising an encoder for encoding the probe signal, whereby it can be distinguished from the signal received from the object.

Claim 24 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 21, further comprising a circuit for determining the positional information of an object irradiated by the probe signal.

Claim 25 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 24, further comprising a comparator for comparing the positional information of the irradiated object to positional information relating to at least one known object, whereby anomalous objects can be identified.

Claim 26 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 25, further comprising an alert signal generator for generating an alert signal in dependence on the result of the comparison.

Claim 27 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 25, wherein the or each object includes or comprises an object incorporating a transmitter.

Claim 28 (Canceled).

Claim 29 (Currently Amended): The apparatus ~~Apparatus~~ according to Claim 1 [[28]], wherein the signals transmitted by the transmitter associated with the object comprise ~~comprise~~ [[are]] Ultra Wide Band (UWB) signals.

Claim 30 (Currently Amended): A method of determining positional information relating to an object incorporating a transmitter, the method comprising:

receiving signals transmitted by the incorporated transmitter at a receiver comprising a plurality of receiving elements in a single housing or on a common substrate;

detecting a signal, signals received at each ~~each~~ [[the]] receiving element ~~elements~~ and ~~for generating output signals representative of the received signals~~; and

applying processing, for each receiving element, a process to the detected output signal generated from the signal received at that receiving element separately from any output signal generated from a signal received at any other receiving element, so as to obtain a respective value of a parameter representative of the time the signal was received at the receiving element, the applied process being further operable to

compare values of the parameter thus obtained so as to obtain angular positional information relating to the object.

Claims 31-89 (Canceled).

Claim 90 (Currently Amended): Apparatus for determining positional information relating to an object incorporating a transmitter, the apparatus comprising:
means for receiving signals transmitted by the incorporated transmitter, said receiving means comprising a plurality of receiving elements in a single housing or on a common substrate;

detection means for detecting a signal, signals received at each ~~[[the]]~~ receiving element ~~elements and for generating output signals representative of the received signals~~; and

processing means operable to apply, for each receiving element, a process to the detected ~~output signal generated from the signal received at that receiving element~~ ~~separately from any output signal generated from a signal received at any other receiving element~~, so as to obtain a respective value of a parameter representative of the time the signal was received at that receiving element, the processor being further operable to compare the values of the parameter thus obtained so as to obtain angular positional information relating to the object.

Claim 91 (New): The apparatus according to Claim 9, comprising a matched filter generator for generating the matched filter in dependence upon the shape of the envelope of the at least one time varying signal.

Claim 92 (New): The apparatus according to Claim 1, wherein each signal has a characteristic frequency of between 2 GHz and 12 GHz.

Claim 93 (New): The apparatus according to Claim 1, wherein each signal has a characteristic frequency of between 5.8 GHz and 7.2 GHz.

Claim 94 (New): The apparatus according to Claim 16, wherein each pulsed signal comprises at least 10, 20, 50, 100 or 500 cycles.

Claim 95 (New): The apparatus according to Claim 16, wherein each pulsed signal has a pulse length of greater than at least one of 5ns, 10ns, 20ns, and 50ns.

Claim 96 (New): The apparatus according to Claim 16, wherein the signals comprise a pulse train having a characteristic repetition frequency of between 5 MHz and 15 MHz.

Claim 97 (New): The apparatus according to Claim 16, wherein the signals comprise a pulse train having a characteristic repetition frequency of between 10.5MHz and 13.5MHz.

Claim 98 (New): The apparatus according to Claim 12, wherein the matched filter generator is adapted to fit the shape of the at least one time varying signal, or the envelope of the at least one time varying signal, to a quadratic function.